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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/079,479  
Filing Date: February 22, 2002  
Appellant(s): LINDNER ET AL.

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Kirsten A. Grueneberg  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed February 23, 2009 appealing from the Office action mailed September 22, 2008.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

### **(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

### **(8) Evidence Relied Upon**

4,001,379	Turk et al	01-1977
EP- 0 937 755	Siray et al	08-1999

### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 4-5, 10-12, 14-19, 22-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP '755 (page, line and paragraph numbers are referenced to the translation of EP '755), and further in view of Turk et al (4,001,379).

EP '755 discloses precipitated silica granules (note abstract).

Product C(13) has N<sub>2</sub>-surface area (i.e. BET surface area) of 188 m<sup>2</sup>/g; DBP absorption of 216 g/100g; CTAB surface area of 170 m<sup>2</sup>/g (note Table 3, Run 13) and maximum Choline chloride absorption of 205g/100g (note Table 9, Product A (6)). The DBP/choline chloride absorption is (216/205 =) 1.05.

In EP '755, the procedure for testing the maximum choline chloride absorption comprises the steps of adding 75% choline chloride solution dropwise to 10 g of the precipitated silica to be tested in a glass beaker. The mixture is stirred with a spatula. The mixture is watched constantly to check when the maximum absorption has been reached. The maximum choline chloride absorption is reached when no more unloaded

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particles are to be found in the mixture and said mixture is not yet waxy or smeary. The maximum choline chloride absorption in g/100g =  $[(a-10) \times 100] / 10$  where a = total weight (note page 37, line 5 to line 38, line 8 or paragraphs [0105]-[0109]). This maximum choline chloride absorption as disclosed in EP '755 is considered the same as the required "choline chloride absorption" since the procedure for measuring the values are the same in EP '755 as in the instant claimed invention.

EP '755 teaches that precipitated silica is known to be used as reinforcing filler for elastomers (note paragraph [0003]) and as a carrier for choline chloride solution (note paragraph [0004]).

For the product claims, the product of EP '755 has BET, DBP, choline chloride absorption, CTAB, DBP/choline chloride absorption values well within the claimed ranges. The only difference is EP '755 does not specifically disclose the Sears number, however, as stated in the Declaration by Dr. Rausch, filed May 7, 2007, the Sears number for product C(13) in EP '755 is 22.6 mg/5g and a margin error of +/- 0.25 mg/5g as stated in the Declaration by Dr. Görl, filed October 22, 2007. Even though the Sears value of 22.6 +/- 0.25 for produce C(13) as disclosed in EP '755 is lower than the claimed value of "greater than 25 m/l", however, the value of "22.6" would have suggested to one of ordinary skill in the art a slightly higher value based upon a reasonable expectation of success, *In re O'Farrell*, 853 F.2d 894, 904, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988).

For the process claims, EP '755 discloses a process for producing precipitated silica by preparing a sodium silicate solution in a container, simultaneously adding

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sodium silicate and sulfuric acid to the container while maintaining a constant alkali index of 7, stopping the addition of sodium silicate, further adding sulfuric acid until the pH of the precipitation suspension has reached 3.0, and the precipitated silica is separated by means of a filter press and eventually spray dried (note Example 3).

The precipitated silica as disclosed in EP '755 is contacted with choline chloride solution (note Table 9).

For other values other than those disclosed in the Examples, EP '755 further discloses the broad ranges such as for product C, the N<sub>2</sub>-surface area (i.e. BET surface area) can be from 180-190 m<sup>2</sup>/g; DBP absorption can be from 220-320 g/100g; CTAB surface area can be 168-171 m<sup>2</sup>/g (note paragraph [0027]). These ranges overlap the claimed ranges.

With respect to the encompassing and overlapping ranges previously discussed, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time of invention to select the portion of the prior art's range which is within the range of the Appellants' claims because it has been held prima facie case of obviousness to select a value in a known range by optimization for the results. *In re Boesch*, 205 USPQ 215. Additionally, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a prima facie case of obviousness. *In re Malagari*, 182 USPQ 549.

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For the limitation “over a period of 40 to 65 minutes” for the step of simultaneously metering aqueous silicate solution and an acid, EP ‘755 only exemplifies a period of 90 minutes in Example 3, however, the teaching of EP ‘755 should not be limited to just the example. For the solids content, EP ‘755 discloses a concentration of 72 g/l after the addition of only sulfuric acid for 30 minutes (after the “reacidifying” step), thus, the solid content before the acidifying step should be higher than 72 g/l (because the solid content would stay the same but the mixture has smaller volume before the step of the adding the extra acid). Again, the teaching of EP ‘755 should not be limited to just the value of 72 g/l as specified in the example (Turk can be applied to suggest a solid content of the suspension as stated below).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the process conditions, such as duration of the “precipitation” step, the solid content after the precipitation step, the alkali number, the pH, etc. in EP ‘755 in order to produce the desired precipitated silica, which is suitable as carrier for choline chloride solution, with the properties as listed above.

For the Sears number, since the product in EP ‘755 is produced by the same process, i.e. constant alkali process, and has values for all other properties that at least overlap the claimed ranges, the range for Sears number for the product of EP ‘755 would also overlap the claimed range. Appellants have not provided any evidence to show that the process of EP ‘755 could not produce a product with the required Sears number. In the event that the Sears number is dependent on the alkali number, Turk ‘370 is applied as stated below.

The differences are EP '755 does not disclose an alkali number of at least 15 and the step of adding of an electrolyte prior to or during the simultaneously adding of sodium silicate and sulfuric acid.

Turk '370 discloses a process for producing silica (i.e., silicic acid) by adding an alkali metal silicate and an acid to an aqueous alkali metal silicate solution while maintaining the alkali number of the reaction mixture substantially constant at a value within the range of 10-40 (note claim 1). Turk '370 also teaches that the precipitation may be effected in the presence of neutral salts (note column 4, lines 53-54). This neutral salt is considered the same as the claimed "electrolyte".

Turk '370 can be further apply to teach that preferably the participants in the reaction are selected so as to obtain an silica end concentration above 65 g silica/l and preferably between 80 and 100 g silica/l (note column 4, lines 3-6).

Turk '370 teaches that the use of a constant alkali number process to produce silica would result in a product that is suitable as carriers for animal feed additives (note column 7, lines 38-42), such as choline chloride solution (note Example 26).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to further add a neutral salt (electrolyte) and to optimize the alkali number between 10-40, as suggested by Turk '370, for the process of EP '755 because such conditions are known and desirable for producing precipitated silica that is suitable as carriers for animal feed additives, such as chlorine chloride solution. Thus, when an alkali number of higher than 15 is used in the process of EP '755, as suggested by Turk



'370, the process of EP '755 would produce a precipitated silica with high Sears number as required in the instant claims.

#### **(10) Response to Argument**

Appellants argue that the methods for preparing the silicas of EP '755 are so-called "pH precipitations methods", in which the pH is kept constant during the precipitation (Examples 1 and 2 of EP '755) while the method of Appellants' claimed invention is an "AN precipitation method" with the alkali number (AN) is kept constant.

As clearly stated in the above rejection, the product and process of EP '755 that are applied against Appellants' claims are from Example 3, which uses a constant alkali number precipitation method (note last 2 lines on page 17, "maintaining a constant alkali number of 7"), not from Examples 1-2 as argued by Appellants.

Appellants argue that for the inherency argument for the Sears number, inherency may not be established by probabilities or possibilities.

As clarified in the above rejection, based on the Declaration by Dr. Rausch, filed May 7, 2007, that stated that the Sears number for product C(13) of EP '755 is 22.6 ml/5g, the rejection is no longer relied on the inherency assumption for Sears number for EP '755. However, the value of "22.6" would have suggested to one of ordinary skill in the art a slightly higher value based upon a reasonable expectation of success, In re O'Farrell, 853 F.2d 894, 904, 7 USPQ2d 1673, 1681 (Fed. Cir. 1988). Furthermore, it would have been obvious to one of ordinary skill in the art to optimize the alkali number and other process conditions, as suggested by Turk '379, in the process of EP '755 to

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thereby optimizing the properties of the silica product so that it can be used as carrier for choline chloride solution.

Appellants argue that the increase of the Sears number by at least 10% compared to EP '755 is significant because it is necessary to achieve affinity between the silica and hydrophilic liquids and without such affinity the desired DBP/CC ratio of below 1.07 cannot be reached, referring to item 13 in the Declaration by Dr. Linder (filed June 2, 2008).

This argument is not persuasive, because as evidence by EP '755, silica product with a DBP/CC ratio of 1.05, which is below the required value of 1.07, and still have low Sears value (as calculated by Appellants to be 22.6 mg/5g).

Appellants argue that the difference of at least 10% between the Sears number and the Sears number of EP '755 is not obvious because it is very difficult to increase the Sears number and at the same time keep all the other parameter as claimed in the ranges as claimed.

The argument is noted, however, there is no evidence or factual data provided to support the above stated argument.

Appellants argue that there is no linear relationship between all parameters and if one parameter is changed, it cannot predict how the other parameters will change.

Again, there is no evidence or factual data provided to support this argument. It is, however, disclosed in Appellants' specification that the Sears number is determined by the alkali number (note page 2, lines 20-23). For other properties of the claimed product, such as surface areas, DBP absorption, etc., these properties may be

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controlled by other process conditions, such as by reaction temperature, reactant concentrations, reaction time, etc., not just by the alkali number. Thus, it would have been well within the skilled of the artisan to produce silica with the desired properties by optimizing the process conditions through routine optimization.

Appellants argue that Turk teaches that increasing the alkaline number would lead to an increase of the DBP.

Granted that Turk does teach that the DBP number of silicic acids that have subjected to a shearing action passes through a flat maximum at an alkali number of 30 going through the range from zero to 40 (note column 16, lines 9-15), however Turk '379 also discloses that other conditions can also affect the DBP number, such as timing and duration of shear action (note Exs. 1-6, especially column 10, line 50 to column 11, line 34) or circulation frequency and shear gradient (note Exs. 9-17, especially column 13, lines 28-51). Thus, Turk '379 fairly teaches the increase of DBP number is small, note "flat maximum", when increasing the constant alkali number and such increase may be adjusted by changing other conditions in the process, such as circulation frequency and shear gradient. Also, there is no evidence on record to show that by increasing the alkali number, only the DBP number increases while the choline chloride absorption stays the same as stated in the assumption made in item 9 of the Declaration by Dr. Linder, filed June 2, 2008; in the event that both the DBP number and the choline chloride absorption increase with increasing alkali number, the ratio between DBP number and the choline chloride absorption could still stay below 1.05. For the combined teaching of EP '755 and Turk '379, the product is desired to have high

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DBP values (note the range of 220-320 mg/l for product C in EP '755, page 4) and also high choline chloride absorption because the products of both EP '755 and Turk '379 are desired to be used for absorption of choline chloride, thus, it would have been obvious to one skilled in the art at the time the invention was made to optimize the constant alkali number in the process EP '755, within the range of 10 to 40 as suggested by Turk '379, along with other process conditions in order to obtain a DBP values within the desired DBP range while maximize the choline chloride absorption as desired by EP '755. Appellants have not provided any clear evidence to show the criticality for the ranges "over a period of 40 to 65 minutes", "having a solid content of the suspension of from 79.3 to 104 g/l" and "a constant alkali number in the mixture of at least 15".

Appellants argue that neither EP '755 nor Turk teaches how to increase the Sears number above 25 ml/5g while simultaneously keeping the DBP/CC ratio below 1.07.

The process of the combined teaching of EP '755 and Turk has substantially all the positive process steps, thus, such process would capable of producing a product having properties, including Sears number and DBP/CC ratio, similar or overlapping the properties of the claimed product. Furthermore, EP '755 teaches that the silica product is used for the absorption of choline chloride (note paragraph [0007]), thus, it would have been obvious to one skilled in the art to optimize the process conditions in EP '755 in order to maximize the choline chloride absorption for the product, thereby minimize the DBP/CC ratio as required in Appellants' claims.

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Appellants argue that only a minimal increase of the DBP (due to the increase in the constant alkali number) would cause the ratio DBP/CC of example C13 of EP '755 to increase to 1.073 which would be out of the claimed range.

For the combined teaching of EP '755 and Turk '379, the use of a different (i.e. higher) the constant alkali number might cause not only the change in the DBP number but also the CC number so the DBP/CC value might not be out of the claimed range as argued by Appellants. Moreover, even if the DBP/CC of example C13 of EP '755 was 1.073 as alleged by Appellants, such value would have suggested to one of ordinary skill in the art a slightly lesser value, such as 1.07, based upon a reasonable expectation of success, *In re O'Farrell*, 853 F. 2d 894, 907, 7 USPQ 2d 1673, 1681 (Fed. Cir. 1988).

Appellants argue that the Sears number was increased in Appellants' claimed invention, as disclosed at page 2, lines 17-20 (it should be lines 20-23) of the specification, where it is explicit pointed out that the silanol group density ( = Sears number) is determined by the alkali number [AN] or in other words by the variation of pH/AN during precipitation, referring to the Declaration by Dr. Linder.

In Appellants' specification, on page 2, lines 20-23, it is disclosed that "it is believed that the high alkali number of the silicas and silicates of the invention, and the inventively prepared precipitated silicas and silicates, results in a high silanol group density and thus enhances a high absorbency for polar absorbates and on page 3, lines 15-20, "[I]n the case of a precipitation reaction at constant alkali number, the pH changes analogously: for example, at a constant alkali number of 30, the pH falls from

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about 10.35 to levels between 8 and 10, depending on the duration of the precipitation reaction". The latter statement fairly teaches that when the process is conducted with constant alkali number, the pH would inherently vary, so the "variation of pH/AN" as argued by Appellants is just another way to indicate that the claimed process is a "constant alkali number" process (versus a constant pH process).

Appellants argue that EP '755 do not sufficiently disclose the variation of pH/AN during the precipitation process.

For this argument, it is assumed that Appellants' process has "variation of pH", which an indication that the process is conducted at constant alkali number, not a "variation of AN" (alkali number) (note claim 10 that requires "a constant alkali number"). In EP '755, Example 5, the process is conducted at a constant alkali number, thus, it would inherently have a variation of pH. When EP '755 is taken in view of Turk, it would have been obvious to one skilled in the art to use high alkali number, for the reasons as stated above, and thereby producing a product with a higher Sears number.

Appellants again argue that the precipitated silica A and B in EP '755 are formed by different process.

This argument is not persuasive because only the product and the process for making silica C are applied against Appellants' claims.

Appellants argue that numerous significant parameters of Appellants' claimed invention are clearly different than those of Example 3 of EP '755.

The teaching of EP '755 should not be limited to just the Example 3. EP '755 clearly discloses the desired properties for the product silica C, which is preferred to be

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used as carrier for choline chloride solution. Thus, it would have been obvious to one of ordinary skill in the art to optimize the process conditions of EP '755, including using a higher constant alkali number, as suggested by Turk '379 in order to obtain a silica product with properties that suitable for being used as carrier for a choline chloride solution.

Appellants argue that the process steps, as required in Appellant's claims 10 and 17, are not disclosed or suggested in EP '755 and Turk, alone or in combination.

The basic process steps are clearly disclosed in EP '755, Example 3. For the values of precipitation period, solid content, etc., it would have been obvious to one of ordinary skill in the art to optimize these process conditions to obtain the desired silica C product. Again, there is no evidence to show any unexpected results or criticality for these claimed ranges.

Appellants argue that there is no disclosure or suggestion in EP '755 in particular of the claimed precipitation period of 40 to 65 minutes followed by reacidifying the mixture to a pH of 7-3.0 to provide an acidified mixture having a solid content of the suspension of from 79 to 104 g/l.

In both claims 10 and 17, the filtering and drying steps are optionally, thus, the "reacidifying step" must have been carried out right after the precipitation step, i.e. the step of simultaneously adding a silicate solution and an acid. In EP '755, after step of simultaneously adding a silicate solution and sulfuric acid, the addition of sodium silicate solution is then stopped and the addition of 94% sulfuric acid is continued for 30 minutes until pH of the precipitate suspension has been set at 3.0 (note paragraph

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[0050]). The last mentioned step is considered the same as the required “reacidifying step”. For the values of precipitation duration and solid content of the suspension, see reasons as stated above.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner’s answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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